



Comparative Study of Surgical Management of Intracapsular Fracture Neck of Femur by Hemiarthroplasty between Austin Moore’s Prosthesis and Bipolar Prosthesis

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Abstract

Introduction: Femoral neck fractures have been considered ‘unsolvable fracture’ in the olden era of orthopaedics due to high rate of associated complications, which include nonunion and avascular necrosis of the femoral head. Prosthetic replacement as a primary procedure eliminates osteonecrosis and non union as complications of femoral fractures and also allows immediate weight bearing to return elderly patients to activity and help avoid complications of recumbency and inactivity.²

The decision to perform hemi arthroplasty using a unipolar or bipolar prosthesis remains controversial,

with proponents on either side. So, in view of varied opinions we desire to compare the efficiency of these two prosthesis unipolar and bipolar prosthesis for the management of intra capsular fracture neck femur in elderly.

Material & Methods: We have done 40 patients above 60 years and an acute displaced fracture of the femoral neck were randomly allocated to treatment by either AMP or bipolar HA. The patients were summoned at 6weeks, 12 weeks, 6 months and 1year. Functional outcome was assessed and compared with Harris hip score and radiological parameters.

Results: In our study, the two groups of patients with mean age of 70.35 in bipolar group and 69.8 in AMP group did not differ in their pre-injury characteristics (sex, fracture pattern, comorbidity, mode of injury and pre-injury ambulatory status) and perioperative parameters such as duration of operation, blood loss, hospital stay and mortality. The mean Harris hip score in Bipolar and AMP group was 90.95 and 86.1, respectively ($p=0.005$), range of motion was 236 and 223.25 with Bipolar and AMP groups, respectively. Functional activities like use of public transport was better with bipolar group. Incidence of complications like Superficial infection, haematoma and acetabular erosion was encountered in AMP group.

Conclusion: The use of a bipolar endoprosthesis in the management of displaced femoral neck fractures in the elderly was associated with better mean Harris hip score and incidence of complications was limited. Hence, bipolar would be a better option in elderly patients with fracture neck of femur. Moreover the cost difference between AMP and Bipolar prosthesis is not much in our country.

Keywords: Hip fractures, Blade plates, Minor injuries, Bipolar Prosthesis, Femoral head

Introduction

Hip fractures are terrible injuries that primarily afflict elder people & have a significant negative impact on both the healthcare system and society at large.¹ Osteoporosis, other illness, and a rise in minor injuries all raise the risk of these fractures and complicate medical management. This high incidence can be attributed to weak bones and an increase in small injuries. Numerous disorders prevalent in this age group can worsen the suffering following fractures and make treating those fractures more challenging. The

aim of treatment is to restore the patient's pre-morbid level of function. The occurrence of these fractures has significantly increased due to an increase in average lifespan and better medical services. Moreover, the awareness of osteoporosis in India is poor and the screening facilities for identifying is poor. It is debatable how to treat intracapsular neck of femur fractures in older people. Because of the high rate of accompanying sequelae, which include nonunion, absence of rigid fixation, and avascular necrosis among others, intracapsular neck femur fractures were labelled "unsolvable fractures" in earlier orthopaedics¹. Several surgical procedures are available. alternatives (including blade plates, partial and complete hip arthroplasty, dynamic hip screw and cannulated screws) are available. Failure of fixing has been attributed to intracapsular extension of the fracture, precarious blood supply to the femoral head passing through the neck, and difficulties in maintaining fracture reduction. A agreement on the best course of treatment, despite advancements in treatment techniques over time, is still elusive.

Objectives

1. To compare the functional outcomes of non-cemented Austin Moore prosthesis with non-cemented non-modular bipolar prosthesis following hemiarthroplasty in neck of femur fractures in elderly patients.
2. To research the complication-related issues in these situations:
 - To compare the length of hospital stays for the two prostheses.
 - To compare Austin Moore's rehabilitation and return to independence in terms of his physical, social, and professional lives with bipolar prosthetics.

- To compare Austin Moore's and bipolar prosthesis radiographic changes following hemiarthroplasty.

Material and Methods

Comparison of the Austin Moore's and Bipolar prostheses used in the surgical treatment of intracapsular femoral neck fractures. Prospective Comparative research was done for the Patients admitted to the hospital who are 60 years of age or older comprise the study population. 42 patients who met the inclusion-criteria & were hospitalized and surgery was done were included. Patients who underwent surgery, using Austin Moore's prosthesis were placed in Group A, whereas those underwent surgery, using the Bipolar Prosthesis were placed in Group B. According to randomised tables, 22 patients were placed in group A and 20 patients in group B. Two patients in group A were unfollowed. In this study, 40 patients with follow-up data up to 1.5 years after surgery were included.

Surgical Technique

Under normal aseptic technique, all surgeries were carried out as an elective procedure. General / spinal anaesthesia was used.

Patient positioning

Patient resting on the contralateral side in lateral posture. With Povidone-iodine, the hip's skin was cleaned. To facilitate simple movement of the extremity during operation, the lower limb was draped with sterile sheets from the groin to the toes individually. For all cases In our series, we adopted the posterolateral technique (Moore's southern Approach).

Incision

- 10 to 15 cm curved incision should be made one inch posterior to posterior edge, of GT begin 7 cm above and posterior to GT

- There are no long-term advantages to hip function from the mini-incision method that curves posterior to the Greater Trochanter and continues down the shaft of the femur.

- To reveal the vastus lateralis, incise the TFL. Distally lengthen the fascial incision to match the incision in the skin.

- Separate gluteus maximus fibres in the proximal incision

- During a split, cauterise the vessels to prevent excessive blood loss.

Deep dissection

- Keep the hip in internal rotation
- Keep stay suturing on piriformis as well as obturator internus-the short external rotators.

- Evidence suggests that the dislocation rate is reduced when the short external rotators are repaired during closure,.

- Make an incision over piriformis & obturator-internus near its insertion on femur.

- incise capsule, using longitudinal or inverted T-shaped incision

- Internal rotate the hip to dislocate it after doing capsulotomy.

- Internal rotation of the thigh with the knee and hip in 90 degree flexion, will posteriorly dislocate the hip joint.

- A femur head gauge was used to quantify the dimensions of the broken femur's neck and head after it had been pushed out from the acetabulum.

- trial prosthesis was used and the the size was verified by its snug fit inside the acetabulum. The residual ligamentum teres & tissues were removed in order to prepare the acetabulum. In order to prepare the femoral shaft for the installation of the

prosthesis, it was rasped with a broach (rasp). The LT was left with 2 to 2.5 cm of calcar femorale above the neck of femur if it was lengthy.

- The prosthesis was introduced into the reamed medullary cavity of the femur with around 10 degrees of ante version.
- The hemostasis was complete.
- The incision was closed in layers after placing a suction drain capsule and external rotators were closed prior to the placement of drain. The suction drain was taken out while doing day 2 dressings.
- Following surgery, the patient is maintained in the recovery area for three hours before being transferred to the post-op ward for one day.
- Intravenous fluids were administered. Following six hours, oral liquids were all lowed.
- Antibiotic injections were continued till 5th post op day
- Hourly Monitoring of vitals done till 24 hrs
- Limb was maintained in abduction using abduction pillows
- Post operative Xrays were taken after 24 hours
- Frequent change I position was encouraged
- Quadriceps exercises started from day 1 post op
- Patient made to stand with walker on the 2nd post op day
- .Patient was allowed full wt bearing and walking with walker on 4th post op day
- Suture removal, was done after 12th post op day
- Functional outcomes were assessed using serial x rays and with the help of harris hip score.

Follow Up

Follow up was started at 2 weeks then at 4 weeks, 6 weeks , 3 months , 6 months and one year. A thorough clinical-examination was conducted at the follow-up.

Patients were assessed for limping, pain, use of support, capacity to climb stairs ,walking distance, , ability to wear shoes and socks, capability to sit on chair, capacity to utilize public transport, deformity, limb length discrepancies, and movements using the Harris hip scoring system. The follow-up report contained a record of all the information. At every visit the xray of the hip that underwent surgery was done.

Interpretation

1. Excellent results (90-100)
2. 2. Good results (80-89)
3. 3. Fair results (70-79)
4. 4 poor result(60-69)
5. 5 any score below 60 is failure.

Results

The information gleaned from this study is listed below. Two patients from Group A out of the total 42 cases included in the study were eliminated because follow-up on them could not be established. 40 patients completed the study in total, 20 in the group A and 20 in the group B. Among the 40 patients, 16 men and 24 women were present. In our series, the youngest person was 60 years of age, and the eldest was 88. The patients in groups A and B were, respectively, 69.8 and 70.35 years old. Following operation, the patients began to walk (partially bearing weight) on mean 3.9 days later. A superficial infection occurred in 2 cases in Austin moores group (group A) and 1 case in Bipolar group (group B).

As per the Harris- Hip Score, each patient in this series was evaluated & given one of the following grades: Excellent/ Good/Fair/ Poor/ Failure. We had an outstanding performance with 75percent of the group B(Bipolar) and 45percent of the group A (austin moore). The group B's average Harris Hip Score was 90.95,

whereas the group A's = 86.1. The group B displayed improved Harris, hip scores. at one year since the variation was Having statistical significance as the p value was (0.005).

Table 1

Harris Hip Score. after 6 weeks	Group A	Group B
Score is Poor(60-69)	15(75%)	14(70%)
Score is Fair(70-79)	5(25%)	6(30%)
Score is Good(80-89)	0	0
Score is Excellent(90-100)	0	0

Table 2

Harris-Hip Score after 3 Months	Group A (Austin moore)	Group B (Bipolar)
Score is Poor(60-69)	3(15%)	2(10%)
Score is Fair(70-79)	10(50%)	10(50%)
Score is Good(80-89)	7(35%)	8(40%)
Score is Excellent(90-100)	0	0
Harris Hip Score after 6 Months	Group A Austin moore	Group B Bipolar
Score is Poor(60-69)	2(10%)	1(5%)
Score is Fair(70-79)	6(30%)	2(10%)
Score is Good(80-89)	11(55%)	13(65%)
Score is Excellent(90-100)	1(5%)	4(20%)

Table 3

X ray changes	Group A(Austin moore)	Group B(Bipolar)
Femoral stem loosening,	nil	nil
Femoral stem-subsidence of prosthesis >5mm,	nil	nil
Sclerosis at the tip of prosthesis,	nil	nil
Acetabular erosion,	2(10%)	nil
Acetabular protrusion,	nil	nil
Heterotopic ossification,	nil	nil
Dislocation or subluxation,	nil	nil

Table 4

Complications	AMP	Bipolar
Superficial infection-	2(10%)	1(5%)
Haematoma	3(13.6%)	2(10%)
Gaping	nil	nil
Post. Dislocation	nil	nil
Prosthetic migration	nil	nil
Acetabular erosion	2(9.1%)	nil
Restricted ROM-	1(4.5%)	nil
Late infection-	nil	2(10%)
Sciatic nerve paresis	nil	nil
Periprosthetic fracture	nil	nil
Deep infection-	2(10%)	nil
No complications-	11(55%)	15(75%)

GROUP AMP, S Mahalakshmi

Preop Xray



Post op xray



Post Op Clinical Picture



Group Bipolar, Lakshamma

Preop image



Immediate Post op image



Post op x rays at followup (3months)



Discussion

The current study was carried out at the GSL General Hospital in Rajahmundry between December 2020 and September 2022. The mean age, of the patient in group A was 69.8 years and in group B was 70.35 yrs. Most of the patients, were between 60-70 years. Male femoral neck fracture patients are in general younger than female patients. In our study female percentage was 60%. In our study, we reported 65% right sided fractures in Group A and 55% in group B. Based on anteroposterior view in internal rotation the fracture pattern is classified among Garden type 1 to 4. Majority of the fractures, in our study belong to types 2 and 360 % in Group A and 50 % in Group B. The majority of individuals in this series stayed for 10 to 15 days, with 55% of those in group B (Bipolar) and 50% of those in group A (Austin Moore). However, 20percent of individuals in group B (Bipolar) were released from the hospital within 10 days because they were making an active recovery, as opposed to 15percent in group A (Austin Moore) group. There was no statistically significant difference after surgery. Based on patient compliance all of our cases were mobilized as quickly as possible. 70percent of the patients in group B bipolar and 55% in group A (Austin moores) were mobilized, within 3 days both in group A and B. During a one-year follow-up, 2 patients, (10%) from the group A(austin moore) had hip pain and acetabular erosion. His physical activity was constrained by a 2 cm shortness

and a severely restricted movement range. As per Baker, it was rated as grade 2 on both instances. In our study, we had 3 cases of superficial infection, 1 (5%) in bipolar and 2 (10%) in AMP group. It was managed conservatively with IV antibiotics, based on the culture growth. 3 (15%) patients in AMP Group and 2 (10%) patients in Bipolar Group developed Haematoma. Some of these patients had incidents of accidental drain removal. We believe that proper suturing of drain is important for preventing haematoma. We had 2 cases of Deep infection 2 (10%) in Group A probably due to poor hygiene and uncontrolled diabetes. Of the bipolar and Austin moore patients in our study, 75 percent reported no discomfort. In the group B (bipolar), the incidence of pain is less, and there is statistically significant difference with p value =0.004. Comparing with only 45 percent of group A (austin moore), 75 percent of group B (bipolar) were capable of walking for as long as they wanted. Here between two groups, there was a statistically significant distinction (p=0.0408).

Conclusion

- Hemiarthroplasty, is indeed a successful method for treating older patients with misplaced femur neck fractures.
- The right preop planning, aseptic measures, other health conditions, as well as attentiveness to operative nuances are essential for the success of - hemiarthroplasty.
- At the completion of an year, many patients having Bipolar prostheses than those with Austin moore had excellent to good outcomes, and the difference was statistically significant.
- After one year, Group A's average Harris Hip score was 86.1, that was lower than Group B's 90.95.

- Despite the variation was not statistically relevant in some aspects, Group A (austin moore) had a higher incidence of problems than Group B (bipolar).
- The two groups' post-operative stays and mortality rates were comparable.
- Radiological difference was not significant between the two groups.
- When comparing the functional evaluation, the group B (bipolar) performed better in every criterion with the exception of the usage of public transportation and the utilisation of support.
- Additionally, Group Bipolar experienced less pain than Group Austin moore.
- It seems that there is a statistically differences between group A and B, with bipolar proving superior in functional characteristics, according to the findings of This study and earlier research.
- Also our study's findings revealed that the occurrence of complications was less with bipolar Hemiarthroplasty, which may point to a benefit over time.

Limitations

The study's biggest drawback is the short study duration and small sample size. All clinical characteristics, with the exception of hip motion, were examined by an objective observer, even though this observer was also not blinded, to the kind of surgical treatment, which may have increased the risk of bias.

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